



AUTONOMOUS, DUAL CHAMBER BIOREACTOR FOR THE GROWTH OF 3-D EPITHELIAL-STROMAL TISSUES IN MICROGRAVITY

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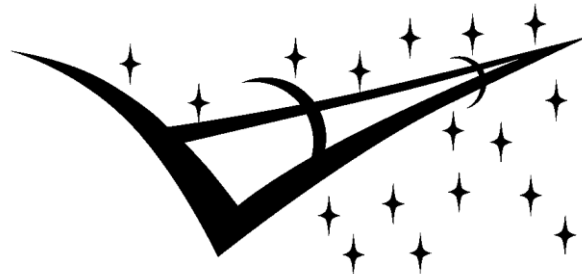
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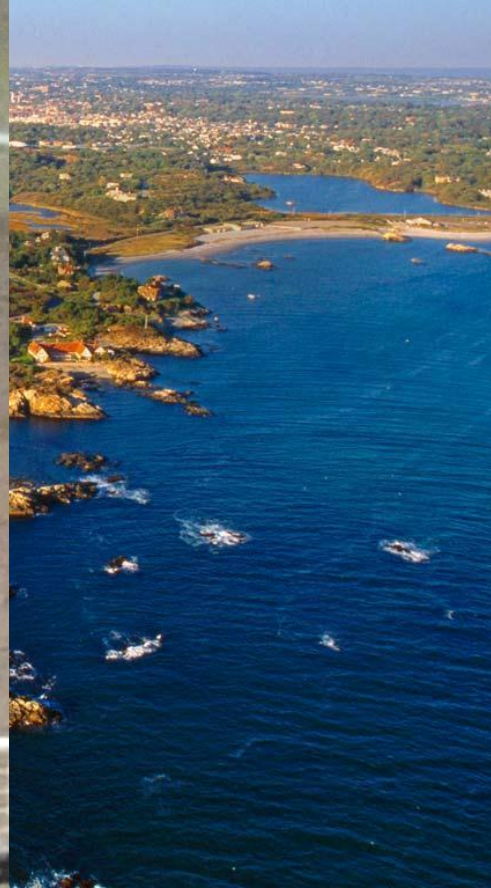
RADIATION

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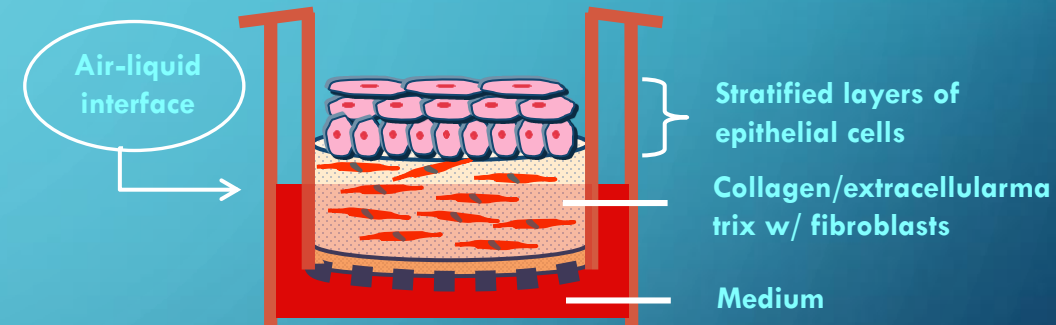


ABOUT ME

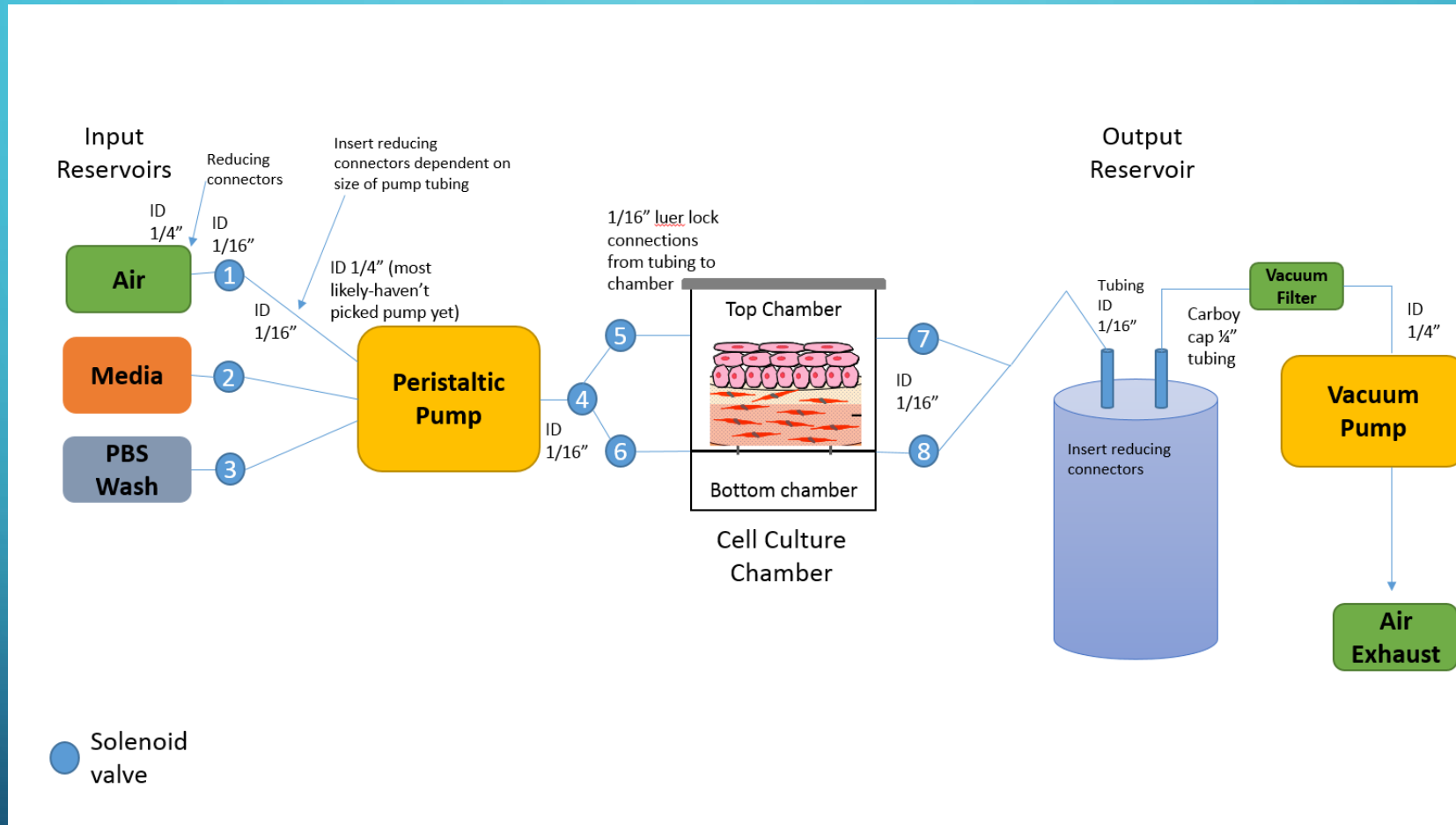


PROJECT BACKGROUND

- Using 3D organotypic models
 - Closely linked to characteristics of normal human tissue
 - Model for effect of microgravity
 - Stressors combined with microgravity
- Critical Air Liquid Interface
 - Bioreactor available for microgravity cell culture does not accommodate
 - This project creates autonomous dual chamber bioreactor allowing for research on 3D tissue models

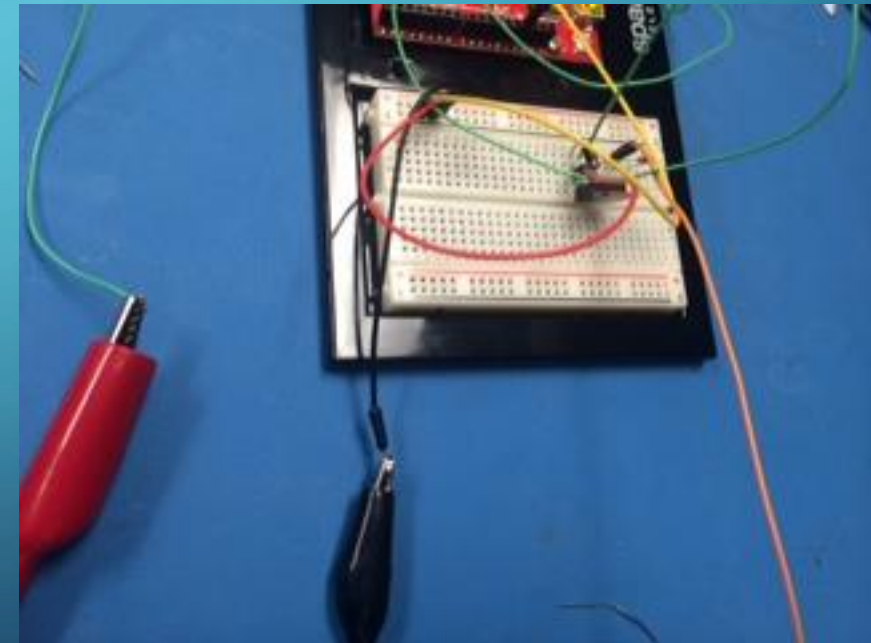
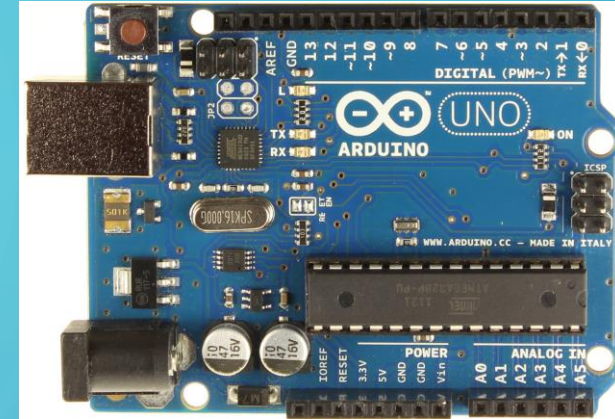


PROJECT SCHEMATIC



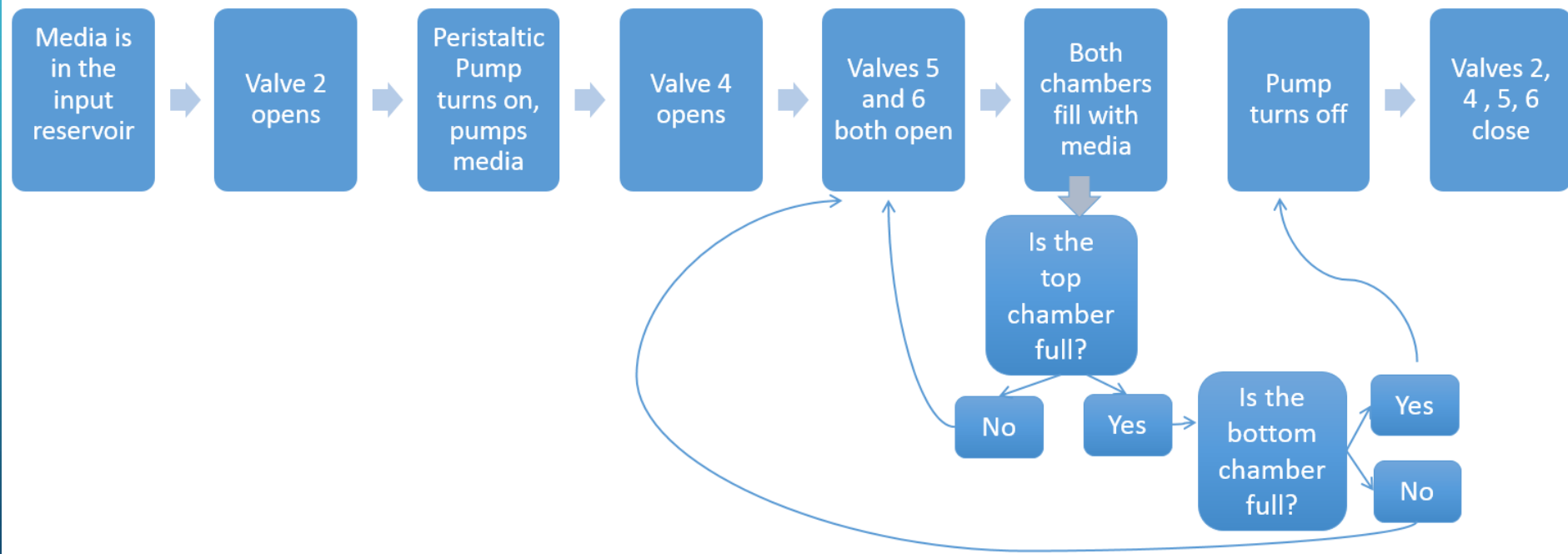
METHODS AND PROCEDURES

- Spent time working at Rice University
- Responsibilities:
 - Researching Parts
 - Electronics and Coding
- Skills and Techniques:
 - Arduino
 - Troubleshooting Code/Circuit
 - Design Process
 - Teamwork
 - Building a System



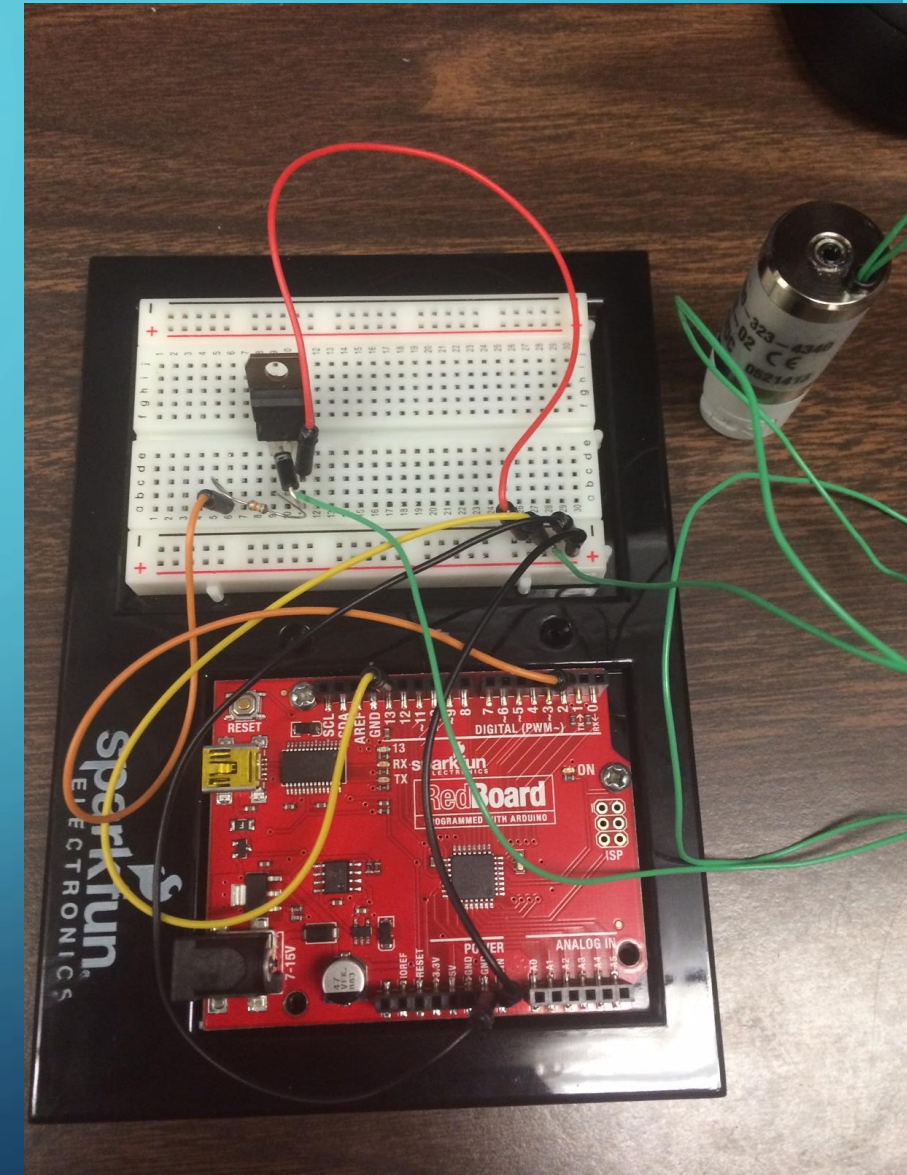
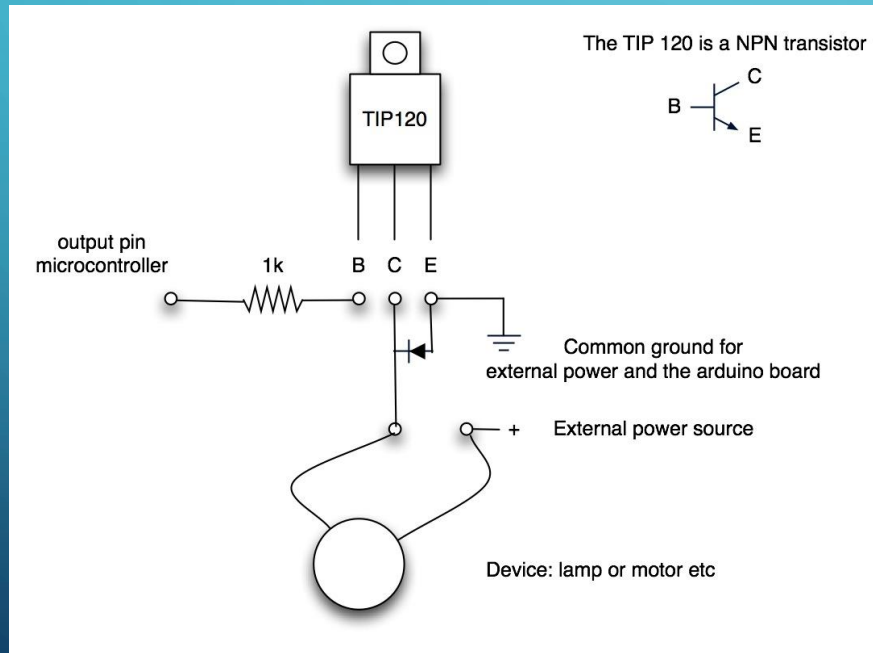
ELECTRONICS AND CODING

Case 1: What Happens At T=0 (when the Media Fills The Entire Chamber)



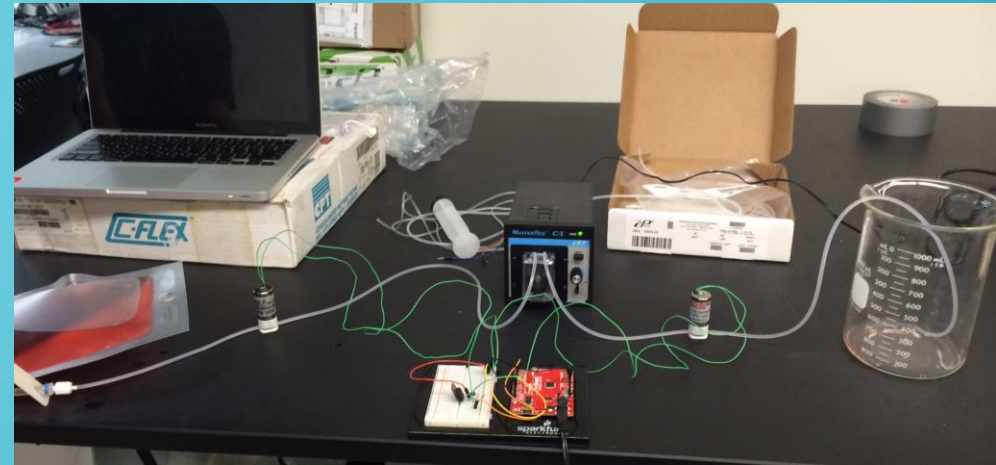
ELECTRONICS AND CODING

- Needed to control 12 VDC devices with Arduino
- Built a solid state relay to act as an electrical switch
- Troubleshooting



RESULTS

- Valves Opening, Pump Turning On According to Code
- Putting it All Together in the System



DISCUSSION

- Contributions:
 - Integral part of the system
 - ISS experimentation
- Lessons Learned:
 - Arduino Coding
 - Technical Ordering
 - Patience in Troubleshooting
 - Working in a Team to Build a System

SLSSI



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